

referring to the abstract of M. Konovaloff's paper in the *Journal of the Chemical Society* for January, 1886, I meet with the following :—"As an explanation of this contact-action phenomenon it is asked whether it is not possible that the bombardment of the molecules on the solid matter causes the kinetic energy of the molecules to be transformed in part into the internal work required for their decomposition."

Perhaps some of your correspondents will kindly furnish me with references to original memoirs (or other sources of information) in which I may find this question competently treated. The idea here put forward by M. Konovaloff is surely not new. It might be extended, as I conceive, to such cases as, for example, the combination of SO_2 and O_2 to form SO_3 , the formation of ammonia from a mixture of NO and H_2 in the proportion of $5\text{H}_2 + 2\text{NO}$, the formation of NO from a mixture of NH_3 with an excess of O_2 , in each case when the gaseous mixture is passed over heated platinum-sponge or platinised asbestos. For some years past this explanation of such contact-action phenomena has appeared to me much more reasonable than such explanations as are generally suggested. The high temperature required in such cases seems to point rather to something in common with the initial dissociation caused by the intense heat of the electric spark, when oxy-hydrogen gas is fired. In such cases as those referred to above the lesser intensity of the heat applied from without may easily be compensated by intra-molecular results of the increased energy with which the impact of individual molecules must take place at high temperatures, and the great extension of the heated solid surface exposed to their bombardment. Under this view (with which my pupils have been familiar for some years past) combination is brought about through the atoms of some of the molecules of the mixed gases being brought into the quasi-nascent state.

A. IRVING

Wellington College, March 10

Variable Stars

IN NATURE for March 11 (p. 440) Dr. Mills, in criticising Prof. Seeliger's *collision hypothesis* of the blazing forth of *Nova*, advances a theory of his own as a presumably original and novel explanation of the phenomena of variable stars. It may be of interest, therefore, to point out that practically the same explanation was suggested in 1878 by Prof. R. Meldola in a paper published in the *Philosophical Magazine* for July of that year.

In this paper the author states : "It is conceivable that in certain cases the composition of a star's atmosphere may be such as to permit a considerable amount of cooling before any combination takes place among its constituents ; under such circumstances a sudden catastrophe might mark the period of combination, and a star of feeble light would blaze forth suddenly, as occurred in 1866 to τ Coronæ Borealis. In other cases, again, it is possible that the composition of a star's atmosphere may be of such a nature as to lead to a state of periodically unstable chemical equilibrium ; that is to say, during a certain period combination may be going on with the accompanying evolution of heat, till at length dissociation again begins to take place. In this manner the phenomena of many variable stars may perhaps be accounted for."

It will be seen that these hypotheses are essentially identical, although it would appear that Dr. Mills limits his explanation to the formation of polymerides (presumably of some primordial matter), these constituting our chemical "elements." I cannot see, however, that he has any reasons for excluding the formation of true compounds, or why he should consider a variable star as necessarily one that is engaged *only* in "making elements." This last process would, no doubt, be the first to take place on the hypothesis of cooling from a state of complete dissociation, but there would surely come a period when the more stable chemical "compounds" could exist, and their formation would also be attended by the evolution of heat and possibly of light also.

JNO. CASTELL-EVANS

London, March 13

The Iridescent Clouds and their Height

COL. TENNANT is mistaken in supposing that the only peculiarity of the clouds which appeared in December 1884 and 1885 is in their being fringed with coloured spectra, though these were, I believe, much more vivid than those of ordinary clouds, as described by him ; besides which, my impression was that the colours were more varied than is usually the case. Col.

Tennant, with his experience, will be better able to say than I am whether there is generally as much blue in the clouds he describes as in those under discussion. I stated in my letter of Dec. 29 last (p. 199) that there was no special amount of blue in the clouds seen the previous day, but on the 31st there was a good deal. However, I do not insist on this as being any important difference ; but, by referring to the numerous letters this year and last about the clouds, he will see there were several other characteristic points.

These clouds are not like any ordinary clouds ; if they can be referred to any of the usual classes they are cirrus, but decidedly different from any cirrus we generally see. Their usually very smooth texture was striking, though some on December 28 (1885) had the ordinary appearance of rippling, but in most cases this was too slight to be visible without optical aid, even when the clouds were broken up into narrow wisps, and in such a position that no colour was produced there was still something in their appearance which struck me as different from ordinary clouds. The frequently rectangular shape was very singular also, though they had not always this form. I said I had not observed this shape in the clouds of December 28, but other observers noted it on that occasion (see pp. 219, 220), and on the 31st I saw many of the clouds with this outline. It is shown indistinctly and with the corners cut off in Mr. C. Davison's sketches (pp. 292, 293). The form is generally described in the letters you have published as rhomboidal, but this is an effect of perspective ; no doubt if the clouds were seen overhead they would appear rectangular. Their great height, too, must have been unusual, though perhaps not greater than that of the singular coloured clouds seen last summer in Bavaria by myself and in this country by others, as described in NATURE, and which differed from the clouds I am now describing in some important particulars. One patch of cloud was observed both here and at Shields on December 28, and a calculation from a comparison of the position as seen from the two places gives its height as 23 miles ; while making the utmost allowance that seems permitted for the roughness of the observations only reduces its elevation to 11 miles. That it was the same patch of cloud observed from both places is undoubted, for one observer of it (H. R. Procter) was travelling from Shields to Sunderland, and he saw that it was the same patch all the time, and the one I had been observing here. The fringes of colour were distinctly visible on this cloud up to 4h. 25m., and feebly so till 4h. 27 $\frac{1}{2}$ m. I concluded that the sun had not ceased shining upon it till that time ; if so, its height would be between 11 and 12 miles. At 4h. 28 $\frac{1}{2}$ m. it was pink with sunset colouring ; but the sun need not have been shining on it then.

The iridescent colours have no connection with halos, as supposed by Mr. Stone (p. 391), no particular colour appearing at any particular distance from the sun, but every colour being seen at any distance, though more vividly at perhaps from 15° to 30° off the sun.

THOS. W. BACKHOUSE

Sunderland, March 12

Forms of Ice

A CURIOUS formation has lately occurred on the surface of a sheet of ice in a tub. Being under a tap, the ice became submerged below several inches of water. Fresh ice then formed as thin vertical plates upon, and at right angles to the submerged sheet. These plates meeting each other in all directions, produced a spongy mass, 3 or 4 inches thick. I do not know if it is a common production, but the special interest attached to it is that it would seem to suggest how "spongy" quartz has arisen, of which I have a specimen consisting of thin and nearly parallel plates ; as well as the well-known form of thin crystalline plates in which calcite may occur. It is just this form of calcite which gives rise to "hacked" quartz, when silica has coagulated or crystallised over a mass of such thin crystals, and then these latter have been subsequently dissolved out.

Why a sheet of ice should increase regularly in thickness by additions to its lower surface, and form this spongy mass on its upper, is a question I should like to hear solved.

Another form of ice I lately noticed on a wall consisted of minute prisms standing in little depressions in the bricks. The circumference of the prism partook of the irregular form of the cavity, giving the appearance of an upward growth.

While speaking of ice, I should like to venture a suggestion to account for its lighter specific gravity than that of water, namely, that water crystallises in masses of complex form ; the

consequence being that the molecules cannot possibly fit together into a compact mass, as, for example, the rhombohedra of calcite do; for ice really resembles compact snow.

GEORGE HENSLOW

Sunrise-Glows

ON the morning of the 7th inst. a curious form of sunrise-glow was observed on Ben Nevis. The sky at the time was covered by a uniform thin sheet of stratus-cloud lying just a little above the hill-tops all round. About 7 a.m., shortly after sunrise, the sun was shining downwards through this cloud, and the valleys to the eastward of Ben Nevis were filled with a "glow" exactly similar in colour and general appearance to the upper glow so often observed before sunrise and after sunset. The temperature at the time was very low— $9^{\circ}.2$ F.—and at 7.16 a portion of a vertical halo passing through the sun's disk was seen. This "under-glow" would seem therefore to have been due to the presence in the air of ice-crystals, rather than of dust, whether cosmic or otherwise.

R. T. OMOND

Ben Nevis Observatory, March 8

A Horrified Cat

LAST week, in connection with a study of Carnivora, I obtained a cat from an acquaintance at a distance, and carefully dissected it in a room above our stable. When I had finished, the cat was, as may be supposed, hardly to be recognised. I cleaned the scalpels, placed them in the case, and took them to the house. No sooner had I put them down than I observed our own cat go and sniff all around the case with a peculiar look of intense wonder. I took the instruments away, and thought no more about it; but a short time after I returned to the remains of the dissected cat in order to prepare the skeleton, when I saw our cat standing at a distance of about a foot from the dissection, and presenting an appearance of most helpless terror. She was trembling from head to foot, and in such a condition of evident horror that my presence had no effect upon her. After some moments she noticed me, and then darted away with a scared look such as I have never before seen. She did not return to the house that day—a thing quite unusual; but on the next day she returned and entered the house with a fearful caution, as though realising the probability that she herself might become a victim to science, and her whole conduct has changed.

This suggests that the country custom of using dead birds, weasels, &c., as a scare to the like is not entirely unreasonable, and it would be interesting to know whether others have noticed similar effects.

E. J. DUNGATE

Horton Kirby, Dartford, March 23

Nocturnal Hymenopterae of the Genus *Bombus*

AS no one has replied to Mr. Doria's letter in NATURE for February 25 (p. 392), I may say, in response to his inquiry, that I have heard in England a number of bees on a species of *Tilia*, at dusk, when it was probably much darker than the "very bright moonlight" referred to by Mr. Doria. It was too dark to watch them, but their "hum" was very audible, and on my dragging down a bough of the tree I saw one bee fly away. In Herman Müller's "Fertilisation of Flowers," English translation, p. 67, it is stated that a social wasp (*Apoica pallida*) in Brazil seeks honey "only by night," sitting still in its nest by day.

Query. Might not the "very bright moonlight," and not habit, be the cause of the bees appearing at night, as described by Mr. Doria? I should hardly think a bee could discern between moonlight and twilight. I have several times seen bees rapidly on the wing, and apparently making for home in the twilight.

JNO. C. WILSON

Fairfield, near Manchester, March 13

A LINGUISTIC REVOLUTION¹

JAPAN, in modern days, is the land of revolution and of change. The systems and habits of centuries are rapidly disappearing; the old order is being dissolved by contact with the West, and every year produces some

¹ "A Short Statement of the Aim and Method of the Romajie Kai" (Roman Alphabet Association of Japan). (Tokio, 1885.)

reform which brings the country more and more into line with Europe and America. There may sometimes be haste, but there is no rest, in Japanese movements; there is little swerving to the right or left, and now for about sixteen years the country has been, on the whole, steadily moving along towards one goal, viz. equality with Western nations, politically, socially, and intellectually. But of all the wonderful changes which the present generation has witnessed in that country, perhaps not one has been so strange or widely beneficial as that the commencement of which is described in the pamphlet before us. And as the first who will profit by it, should it prove ultimately successful, will be the rising generation which has to study Western science in all its branches, it deserves special description in these columns.

It will be known to many of our readers that the Japanese language, which, in its genius and structure, is wholly different from that of China, is nevertheless written by means of the Chinese ideographic or pictorial signs, aided by two alphabets or syllabaries, themselves based on Chinese characters. The object of the new movement, shortly stated, is to sweep away these signs altogether, so far as Japan is concerned, and to use Roman letters only in writing the language. The Association, which has been formed to carry out, as far as a private body can, this reform, has issued the present pamphlet by the advice of Her Majesty's Minister in Tokio, with the view of making known abroad a movement "which its authors believe to be an important step in the intellectual progress of their country." We cannot do better than follow this official statement of the evils of the present system, which is an incubus on the intellect of the nation, and which adds incalculably to the mental toil, more especially of its scientific youth, at the most important stage of their lives. It may be well, however, to say at the outset that the reform is no mere craze of a few misguided enthusiasts. The Society numbers amongst its most active and sympathetic members not only Japanese scholars of eminence who have studied their own as well as Western languages, but also Europeans and Americans who have devoted their lives to the study of the Japanese language and literature, and Western diplomats who are most unlikely to participate in any visionary movement of large nature. When men drawn from these various classes with the best means of studying the question on the spot join together with the object of carrying the reform in practice, we, who have not the same opportunities of becoming acquainted with the local circumstances, may be excused from discussing its practicability any further. We may take that for granted, or we should not find the names supporting the reform that we do. Another point to be noticed is, that hitherto the Government has officially held aloof from the Association, preferring, no doubt, to allow private effort to prepare the soil beforehand. To return, however, to the pamphlet issued by the Society.

The object of the Romajie Kai, it states in the first sentence, is to introduce the use of Roman letters, instead of Chinese ideographs, for writing the Japanese language; when a language can be adequately represented to the eye by twenty-two signs indicating sounds, why (it asks) waste time and effort by continuing to represent it by many thousands of symbols pictorially representing objects and ideas? It is a labour of years to learn to write the Japanese language as at present written, viz. with Chinese characters supplemented by syllabaries invented by Japanese scholars a thousand years ago. The number of Chinese characters is not their only disadvantage. Upon their introduction (we here employ for the most part the exact words of the pamphlet) into Japan, it was early found impossible to restrict the employment of them to the expression of purely Japanese words of corresponding signification. The Chinese sounds, or, rather, a more or less inaccurate approximation to the Chinese